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Imaging

ADAPTIVE ITERATIVE DOSE REDUCTION IS ASSOCIATED WITH SIGNIFICANT REDUCTION IN TOTAL AND COMPUTED TOMOGRAPHY CORONARY ANGIOGRAPHY RADIATION EXPOSURE AND IMPROVED IMAGE QUALITY, COMPARED TO TRADITIONAL FILTERED BACKPROJECTION ON 320-MULTIDETECTOR COMPUTED TOMOGRAPHY

Poster Contributions
Poster Sessions, Expo North
Saturday, March 09, 2013, 3:45 p.m.-4:30 p.m.

Session Title: Imaging: CT/Multimodality IV
Abstract Category: 20. Imaging: CT/Multimodality
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Background: Adaptive iterative dose reduction (AIDR) has been introduced to improve image quality and reduce radiation exposure. Little is known about the impact of this reconstruction method on radiation exposure compared to standard filtered backprojection (FBP) on 320-mulitdetector CT (320-MDCT) coronary angiography.

Methods: We compared radiation dose, contrast-to-noise ratio (CNR) and image quality in 55 consecutive patients imaged on 320-MDCT for CTA using FBP and 110 consecutive patients with AIDR. Table shows imaging parameters. CNR was measured as (left main attenuation-neighboring perivascular tissue attenuation) / noise. Radiation dose was estimated using standard parameters. Image quality was assessed using a 5 point scale (1-poor, 5- excellent). One-way ANOVA and unpaired t-test were used for comparing variables between groups.

Results: Mean age and BMI were not different between FBP and AIDR (54±14 vs 53±11, p=0.7 and 31±7 vs 29±5, p=0.1). Overall radiation dose was significantly lower with AIDR (5.1±3.4 vs 8.2±7.3 mSv, p=0.0042). Based on HR, with AIDR, 1-, 2- and 3-beat acquisition was done in 83%, 15% and 2% of patients, respectively. Radiation dose was lowest in 1- beat patients with mean HR of 56±6 (p<0.001). There was no difference in noise. CNR and image quality were significantly higher with AIDR (Table).

Conclusion: AIDR was associated with significantly lower radiation dose and improved quality compared to FBP on 320-MDCT, especially with single-beat acquisition.

Tube Voltage,Current, Effective Radiation Dose, CNR & Image Quality between AIDR & FBP on 320-MDCT			
	FBP	AIDR-3D	p-value
Tube Voltage (kV)_CTA	120 [100-120]	100 [100-120]	p=0.0003
Tube Current(mA)_CTA	400[400-400]	360[302-465]	p=0.0963
Effective Dose(mSv)_Total	8.2±7.3	5.1±3.4	p=0.0042
Effective Dose(mSv)_CTA-Total Patients	6.7±7.1	3.2±3.2	p=0.0008
Effective Dose(mSv)_CTA (1- Beat, HR 56±6)	N/A	2.3±1.3	p<0.001
Effective Dose(mSv)_CTA (2- Beat, HR 71±13)	N/A	6.9±5.1	p<0.001
Effective Dose(mSv)_CTA (3- Beat, HR 76±3)	N/A	12.6±6.1	p<0.001
CNR	16.9±8.1	21.8±6.5	p=0.0002
Image Quality	3.4±1.1	4.0±0.6	p=0.0011